Unity of Command—Countering Aircraft and Missile Threats

By VINCENT P. DIFRONZO

DOD

P–51s escorting bombers during World War II.

Joint force commanders (JFCs) must achieve and maintain air superiority against a range of threats. Controlling the air is a prerequisite for force projection, surveillance, interdiction, strategic attack, and surface maneuver. Politically, command of the air environment can be an integral aspect of coalition cohesion, especially when population centers are at risk.

The joint warfighting capability assessment (JWCA) process was instituted to ensure that the warfighting needs of CINCs are met. To support this process, the air superiority JWCA team established a framework, based on a strategy-to-task analysis, for controlling the air. It focuses on gaining unimpeded use of airspace while denying it to an adversary. One aspect of the strategy-to-task analysis is that myriad aircraft and missile threats—aircraft, cruise missiles, ballistic missiles, and surface to air missiles—must be neutralized to attain air superiority.[1]

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Because all components and allied forces have some assets to counter such threats, JFCs face a dilemma in integrating them. Lessons from World War II to Desert Storm highlight the role unity of command plays in neutralizing threats. In terms of emerging capabilities, these lessons also reinforce the relevance of command which unites offensive and defensive operations, since the former can profoundly reduce stress on the latter. Moreover, countering aircraft, cruise missiles, and ballistic missiles is tied to theater air operations and is central to airspace control. For instance, fighter and surface based air defenses must be integrated under a single air commander to maximize effectiveness, minimize fratricide, and avoid inhibiting offensive air operations such as close air support and interdiction. Therefore, joint force air component commanders (JFACCs) must have responsibility and authority to control joint operations to counter aircraft and missile threats.

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The World War II Record

Operations in Western Europe in the latter part of World War II, when contrasted to Desert Storm, reflect the importance of unity of command in air superiority. Allied unity of command for air superiority fifty years ago was marginal, whereas in the Gulf War there were very clear lines of authority. In the European theater the Allies had two commanders with different concepts of how airpower might achieve their objectives. General Carl Spaatz, commander of U.S. strategic air forces, felt the *Luftwaffe* had to be defeated before the Normandy invasion by striking enemy aviation and oil industries as well as the *Luftwaffe* itself. But Air Chief Marshall Sir Trafford Leigh-Mallory, who had responsibility for Allied tactical forces dedicated to support the land invasion, held that air superiority could be achieved by waiting to fight off the *Luftwaffe* over the beaches of Normandy during the landing. It is an understatement to characterize Leigh-Mallory's approach as high risk.[2]

U.S. Air Force

Squadron Leader Joseph Berry, RAF, credited with downing 60 1/3 V–1s.

Strategic bombing losses had become prohibitive in 1943 and the Allies had not established air superiority. Spaatz realized that an all out effort, including P–51s and medium bombers under Leigh-Mallory's control, would be needed to defeat the *Luftwaffe*. But the air marshall would not release medium bombers for counterair operations. After debating this question for weeks, Spaatz won support from Air Chief Marshall Sir Arthur W. Tedder, the deputy supreme commander, who directed Leigh-Mallory to support the counterair operation. P–51s began escorting heavy bombers deep over German territory as fighters and medium bombers attacked *Luftwaffe* airfields. Direct air and ground attacks against the German air force greatly increased Allied bomber survivability and imposed a 20 percent monthly pilot attrition rate on the *Luftwaffe*.

Meanwhile, Spaatz ordered controversial attacks against the enemy oil industry. Primarily because of persistent attacks on the *Luftwaffe* and its source of fuel, not a single German aircraft successfully threatened the landing force during the daylight hours of June 6, 1944.[3] Within the first week of the invasion, the few operational German fighters within striking range were directed to "abandon the ground support role" and concentrate on air defense. Meanwhile, the continuing bomber offensive destroyed 90 percent of enemy aviation fuel by the end of June 1944, rendering the *Luftwaffe* ineffective against ground forces and only marginally effective against air operations.

Even though coordination alone is normally not adequate to achieve unity of effort, most of these operations occurred prior to the invasion when competition for Allied air resources was not based on requirements for ground combat or air defense and there was time to debate strategy. But despite overcoming command discontinuity in operations against manned aircraft, the Allies were not as fortunate with Operation Crossbow—countering V–1 cruise missiles and V–2 ballistic missiles—for which a special committee was established to direct intelligence and operational efforts.

Crossbow directives were inconsistent and, despite ample information on launch sites and their infrastructure, the lack of perfect intelligence became an excuse for delaying critical targeting decisions. For instance, the original launch infrastructure for V–1s was completely destroyed prior to the initial attacks, delaying the V–1 offensive by several months. But the committee chose not to target alternate launch sites which were under rapid development. Ultimately, the Germans staged the V–1 offensive from those sites and Allied operations against them were erratic. Moreover, the committee failed to direct targeting against three supply dumps used for the final assembly of V–1s, despite the fact that a single attack on one site led to a marked reduction in launches for a week.

Nor did the committee come to decide on the best weapon system to employ against launch sites. Despite evidence that low altitude fighter attack had the pin-point accuracy to neutralize such facilities with minimal sortie expenditure, the committee refused to commit fighters, preferring to use heavy and medium bombers which were too inaccurate for the task. The Allies compensated in mass and committed 31,000 sorties, or 22 percent of the air effort between November 1943 and May 1944, to strike the original launch infrastructure. However, the payoff was marginal because alternate launch sites and supply depots were ignored.

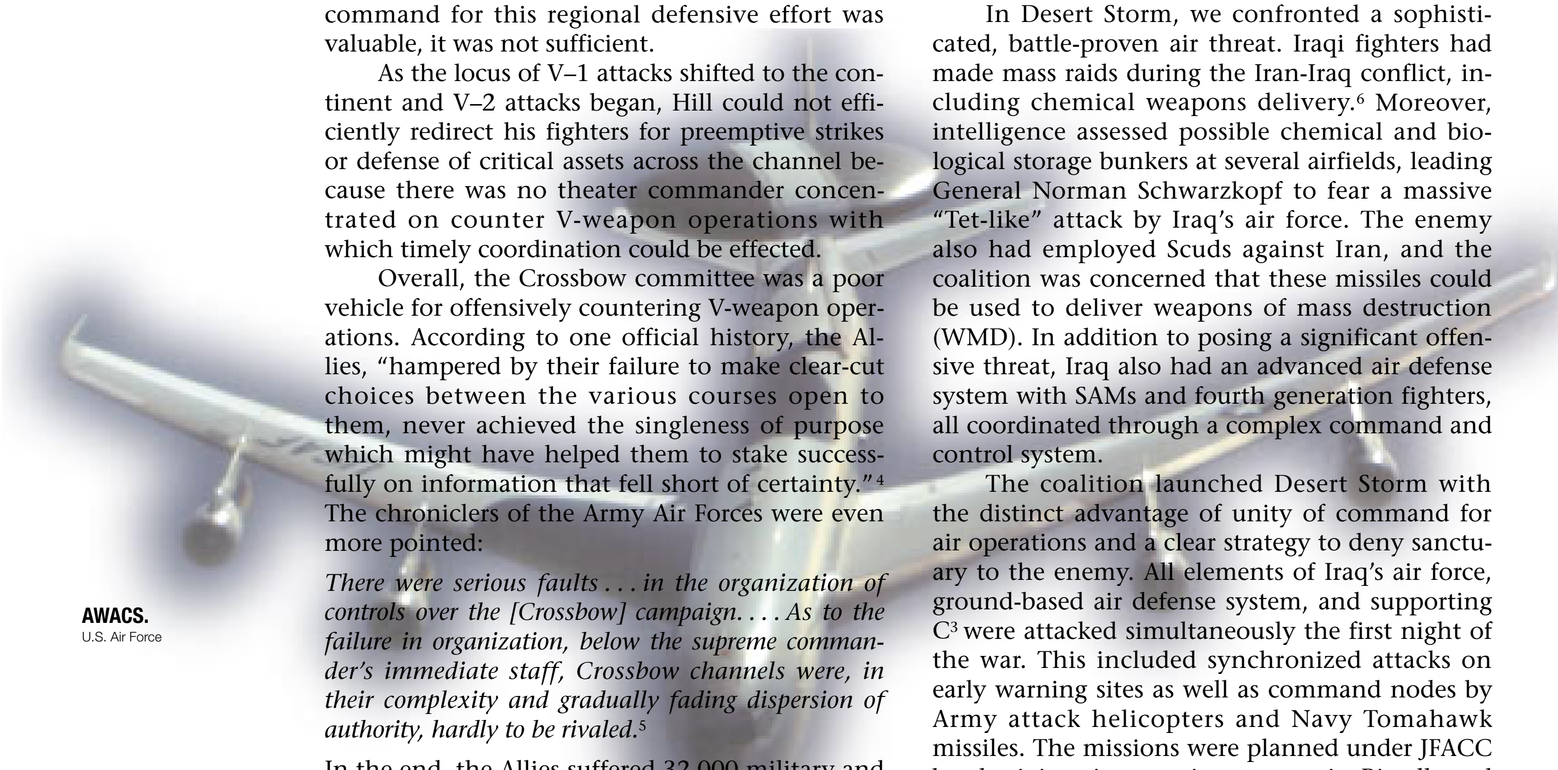
Defensively, the Allies had no capability against V–2 ballistic missiles, employing fighters and anti-aircraft (AA) guns against V–1 cruise missiles. Fortunately, because they had successfully countered the aircraft threat, air defenses in London, Antwerp, and Liege were optimized against V–1 missiles, greatly increasing air defense effectiveness.

Air Marshall Sir Roderic Hill was responsible for AA, fighters, and barrage balloons in the defense of Britain. Initially AA guns were not appropriately calibrated to engage V–1s, so Hill restricted gun operations and modified the rules of engagement to take full advantage of fighters. After the guns had been modified, he saw an opportunity to improve the entire air defense system

by repositioning guns to optimize their effectiveness while restricting fighters. Six weeks after the guns were repositioned, air defense performance peaked as the guns and fighters intercepted 90 of 97 cruise missiles in one day. Although unity of command for this regional defensive effort was valuable, it was not sufficient.

As the locus of V–1 attacks shifted to the continent and V–2 attacks began, Hill could not efficiently redirect his fighters for preemptive strikes or defense of critical assets across the channel because there was no theater commander concentrated on counter V-weapon operations with which timely coordination could be effected.

Overall, the Crossbow committee was a poor vehicle for offensively countering V-weapon operations. According to one official history, the Allies, "hampered by their failure to make clear-cut choices between the various courses open to them, never achieved the singleness of purpose which might have helped them to stake successfully on information that fell short of certainty."[4] The chroniclers of the Army Air Forces were even more pointed:



AWACS.
U.S. Air Force

There were serious faults . . . in the organization of controls over the [Crossbow] campaign. . . . As to the failure in organization, below the supreme commander's immediate staff, Crossbow channels were, in their complexity and gradually fading dispersion of authority, hardly to be rivaled.[5]

In the end, the Allies suffered 32,000 military and civilian casualties as the result of V-weapons.

In retrospect, despite disunity of command the Allies succeeded against the manned aircraft threat because General Spaatz was able, through persistence and personal commitment, to marshal unity of effort against the *Luftwaffe*. Operations against the V–1 and V–2 lacked unity of command and effort and thus failed to neutralize the threat.

The Lessons of Desert Storm

We again floundered over unity of command for air operations during both the Korean and Vietnam conflicts. Then, in 1986, the Joint Chiefs of Staff codified the concept of a single joint air commander in Joint Pub 3–01.2, *Counterair Operations*. According to it, counterair operations are "all measures such as the use of SAMs, AAA, fighters, bombers, and ECM to defeat the enemy air and missile threat both before and after launch." Fortunately, this doctrine was applied during the Gulf War, with unity of command for all air operations to include air superiority. As JFACC and area air defense commander, Lieutenant General Charles Horner, USAF, integrated offensive air operations as well as directing "a combined, integrated air defense and airspace control system in coordination with component and other friendly forces."

Iraq had an advanced air defense system with SAMs and fourth generation fighters

In Desert Storm, we confronted a sophisticated, battle-proven air threat. Iraqi fighters had made mass raids during the Iran-Iraq conflict, including chemical weapons delivery.[6] Moreover, intelligence assessed possible chemical and biological storage bunkers at several airfields, leading General Norman Schwarzkopf to fear a massive "Tet-like" attack by Iraq's air force. The enemy also had employed Scuds against Iran, and the coalition was concerned that these missiles could be used to deliver weapons of mass destruction (WMD). In addition to posing a significant offensive threat, Iraq also had an advanced air defense system with SAMs and fourth generation fighters, all coordinated through a complex command and control system.

The coalition launched Desert Storm with the distinct advantage of unity of command for air operations and a clear strategy to deny sanctuary to the enemy. All elements of Iraq's air force, ground-based air defense system, and supporting C^3 were attacked simultaneously the first night of the war. This included synchronized attacks on early warning sites as well as command nodes by Army attack helicopters and Navy Tomahawk missiles. The missions were planned under JFACC by the joint air operations center in Riyadh and disseminated on the air tasking order.

During the initial hours of the campaign, Iraqi SAM operators came to fear high-speed antiradiation missile (HARM) attacks and transitioned to non-radar guided launches, greatly increasing survivability but severely limiting lethality. We persistently targeted airfields since enemy fighters posed a multi-role offensive and defensive threat. Airfield attacks, compounded by 14 Iraqi air-to-air losses in the first two nights, convinced Baghdad to disperse its air force rather than challenge coalition airpower, much like the SAM operators who chose survivability over effectiveness.

Offensive missiles, primarily Scuds, also were a challenge. Allied aircrews had not trained against Scuds, and intelligence on infrastructure was sparse. A total of 1,245 sorties were flown against the Scud infrastructure, including production facilities, hide sites, lines of communication, and C^3. Another 1,215 sorties were launched as combat air patrols (CAPs) to attack launchers and support vehicles. Of these, a thousand were diverted to alternative interdiction or strategic targets after the time allotted for a CAP expired. Inadequate sensors and cumbersome communications made it difficult to find and attack transporters, erectors, and

launchers (TELs). However, fighter presence may have deterred Scud launches.

Special operations forces (SOF) were also integrated into counter-Scud operations. Initial aircrew reports of success, combined with compelling battle damage video, reinforced by a sharp decline in Scud launches, convinced air planners that these attack operations were effective. Despite limited battle damage assessment capability, coalition SOF teams also verified several Scud TEL kills. Moreover, the Scud launch rate during Desert Storm was 35 percent lower than against Iran in the so-called "War of the Cities" of 1988 despite the fact that Iraq possessed more launchers and missiles during the Gulf War.[7] Attacks against infrastructure and TEL facilities—operations not exercised by the Iranians in 1988—were a likely cause for reduced launches. Furthermore, the enemy executed 80 percent of its launches at night, most in poor weather. This is a logical way of limiting vulnerability, consistent with the actions of Iraqi air defense and air force counterparts who also more highly valued survival. Overall, there was a trend that reflected a reduction in launches by enemy aircraft, guided SAMs, and Scuds despite the capacity to employ those weapons.[8]

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Iraqi aircraft bunkers during Desert Storm.

Patriot represented the coalition's only defensive theater ballistic missile (TBM) capability. Despite the controversy over tactical effectiveness, Patriot missiles protected forces and population centers in both Saudi Arabia and Israel. While primarily relying on Scuds for offensive air attack, Iraq launched one mission with two F–1 Mirages into Saudi airspace, possibly with Exocet anti-ship missiles. Saudi F–15s destroyed the fighters under AWACS control. In this case, our forces were protected in a time-critical situation with standardized procedures and unity of command.

Throughout the campaign, unity of command for air operations led to a coordinated offense and defense that included assets from all components and coalition members, unlike experiences in World War II. A fully integrated joint approach is even more important against emerging threats.

Threat Trends

The aircraft and missile threat of the future will be more capable and diverse than in past conflicts, including increased lethality, range, accuracy, stealth, and progressive countermeasures. Fourth generation threat aircraft such as the MiG–29 are being produced and exported, while older aircraft like MiG–21s are being modified with fourth generation weapon capabilities. Additionally, advanced SAMs are being acquired worldwide and counter-stealth capabilities are in high demand.

Offensively, ballistic missiles are being acquired by developing nations as more advanced missiles are produced with increased ranges. For instance, the maximum range of Iraq's modified Scud is 600 kilometers. North Korea recently tested the 1,000-kilometer Nodong missile and also is working on the Taeodong II, a missile with a 3,500 kilometer range. Anti-ship cruise missiles have been a threat since the 1960s, and the spread of stealth technology will increase the risk to naval forces, especially in littorals. Land attack cruise missiles could also be a serious threat if guidance improvements are married with stealth capability. The accuracy of cruise missiles will improve with access to advanced internal navigation technology and satellite navigation information, such as the American global positioning system and Russian global navigation satellite system.

But the most serious trend, WMD proliferation, does not typically rely on accurate delivery vehicles. A number of states, including Iraq, Iran, North Korea, Syria, Libya, and former Soviet republics, possess or are seeking the technology for nuclear, biological, and chemical capabilities. These weapons can be paired with aircraft, cruise missiles, or ballistic missiles.

Air Superiority Trends

The United States is moving to counter the diverse aircraft and missile threat. A review of future systems illustrates how different systems must be synchronized to achieve unity of effort. Future fighters such as the F–22, with its high speed and low observability, will enable our forces to dominate the air over enemy territory early in the campaign, clearing the path for other attack and surveillance aircraft and protecting friendly forces from aircraft and cruise missile attack as well as preventing aerial observation.

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Apache cruise missile awaiting buyers.

Improved surveillance systems will ensure early detection of cruise missiles and aircraft. AWACS, E–2s, and potential aerostats will offer cues via LINK–16 to fighters as well as terminal systems. Wide-bandwidth communications, such as the Navy cooperative engagement capability (CEC), will allow raw data from multiple sensors to be fused in real-time to enhance the common air picture. With sufficient sensor data, CEC can extend the engagement range of terminal systems beyond the horizon line-of-sight.

systems must remain integrated in air defense architecture to provide layered defense

SAMs can be neutralized by HARM, the joint standoff weapon (JSOW), the Army tactical missile system (ATACMS), and the Navy tactical land attack missile system (TLAMS). Non-lethal SAM suppression will depend largely on the upgraded Navy EA–6B. Detailed centralized planning along with joint battle management will support timely decentralized execution.

The Patriot PAC–III will offer an improved capability over the PAC–II of Desert Storm and, along with Navy lower-tier assets, will provide a basic TBM point defense while preserving or improving defenses against the air-breathing threat. Therefore, these systems must remain fully integrated in air defense architecture to provide a layered defense in the future. The Army THAAD and Navy upper-tier will engage TBMs at higher altitudes and defend larger areas. The airborne laser will intercept TBMs during the boost phase, protect wide areas, and deposit warhead debris over enemy territory—a deterrent to WMD use. Because such systems take time to field, we will be even more reliant on offensive measures as part of an overall counterair strategy in the interim.

Collectively, improvements in attack operations systems since Desert Storm are significant. For post-launch strikes, overhead detection of TBMs is now processed more effectively to locate launch sites, probably the greatest shortcoming in attack operations during the Gulf War. Soon after launch, evolving battle management systems will be able to pass launch point estimates to fighters, ATACMS, and attack helicopters. Currently, F–15Es, F–16s, and F–18s have moving target indicator (MTI) radar modes that allow them to track fleeing TELs. Additionally, U–2 sensor information is being processed in-theater in near real-time, in contrast to Desert Storm operations where control and processing resided in the United States. JSTARS offers a wide area capability with MTI for moving targets and synthetic aperture radar for fixed target location. Unmanned aerial vehicles provide similar capabilities deep in enemy territory.

Much remains to be done to exploit inherent sensor capabilities to detect and identify time-critical targets. Intelligence and surveillance information must be combined in near real-time, analyzed, and preferably data-linked to shooters to minimize time-lines. Further, from a planning and execution standpoint, joint battle management will be essential for capitalizing on these varying capabilities which will also be in high demand for other mission areas.

Overall, a significant investment is being made in weapons systems which either directly or indirectly contribute to attaining air superiority. These will be complimented by battlespace awareness and battle management tools. A challenge to JFCs will be ensuring unity of effort to prevent piecemeal use of these systems. The first step toward success is a logical doctrinal construct.

Air Superiority

According to joint doctrine, "The purpose of unity of command is to ensure unity of effort under one responsible commander for every objective." Current doctrine recommends that JFCs normally designate JFACCs as supported commanders for counterair operations.[9] This obviously includes command authority for all joint operations to defeat both aircraft and SAM threats, based on JFC guidance. However, for operations against cruise and ballistic missiles, doctrine sanctions divided responsibility among the components.

There are a number of advantages to completely integrating counter-TBM and cruise missile efforts with overall air superiority operations. First, JFC needs to ensure forces and vital interests are free of air attacks. Defeating part of the air

threat is inadequate in an era when delivery vehicles are becoming more accurate and lethal and can project WMD. Second, all systems with an aircraft defense capability also have capabilities against missiles—Patriots, Aegis destroyers and cruisers, and Hawks either can or will soon be able to counter aircraft, cruise missiles, and ballistic missiles as fighters engage aircraft and cruise missiles. JFACCs, who derive their authority from JFCs and maintain a dialogue with JFCs and other components, can capitalize on strengths in one defensive system to offset weaknesses in others, based on the overall enemy air order of battle. Last, offensive operations can be prioritized to compensate for weaknesses in defense and vice-versa.

Operational capabilities used to counter aircraft threats often overlap with those used against cruise missiles. To operators of surveillance and weapon systems, cruise missile and aircraft radar tracks will often appear identical in their flight profile, airspeed, and altitude. This normally means that rules of engagement, combat ID, and weapons control measures will be similar if not the same for defense against aircraft and cruise missiles. Furthermore, overlaps and voids in engagement capability between surface-based systems and fighters must be managed to optimize overall system capability. For example, surface based systems designed to engage TBMs at high altitude can be augmented by fighters to take on low-altitude cruise missile and aircraft threats. This level of teamwork requires clear command authority and an integrated communications system.

In addition, overall rules of engagement and defensive force lay-down must be consistent with the air concept of operations and airspace control measures.[10] As airspace control authorities, JFACCs are charged with safe passage of joint and combined offensive, surveillance, and support missions to include military airlift and civil aviation. Integrating air defenses with other airspace requirements in a combat zone is daunting because of the enormous demand on limited airspace. For example, JFACC deconflicted 3,000 sorties per day during the Gulf War while monitoring and controlling 160 restricted operational zones, 122 airborne refueling points, 32 CAP areas, 10 air transit routes, 60 Patriot engagement zones, 312 missile engagement zones, 60 restricted fire areas, and 17 airbase defense zones. Because of the underlying friction between airspace control measures and air defense (including missile defense), any change can cause a ripple effect. Thus, centralized planning under JFACC is essential with a streamlined battle management structure to support decentralized execution of air defense while simultaneously providing airspace control.

Ultimately, JFCs must integrate air defenses to maximize the attrition of enemy air vehicles while minimizing fratricide. Previous exercises have identified a positive correlation between high threat attrition and high fratricide. Several variables influence that link, including clear command authority, joint training, combat ID capability, and interoperable communications links. JFCs and components can influence our capability in the short term by integrating aircraft and missile defense operations under JFACCs and pursuing joint training consistent with this approach.

Historically, positive control over terminal systems by JFACCs through decentralized battle management systems such as AWACS has limited fratricide. Positive control of terminal systems also minimizes procedural routing constraints on CAS and short range air interdiction missions, effectively giving corps or MAGTF commanders more offensive airpower to support close combat operations. This will remain the case against aircraft and cruise missiles because of their similar flight profiles. Finally, positive control never infringes on the right to self defense and does allow surface commanders the flexibility to position organic air defense units as required to protect their forces. However, procedural control is normally adequate for ballistic missile engagements, given that engagement airspace is deconflicted, since there is minimal risk of fratricide. Of course, JFACCs can also influence overall defensive performance by reducing the diversity and number of threats through offensive operations.

More importantly, JFACCs can prioritize offensive operations to compensate for weakness in defense. Unfortunately, current joint doctrine considers attack operations against cruise missiles and ballistic missiles to be part of "counterair, strategic attack, interdiction, fire support, maneuver, antisubmarine warfare, antisurface warfare, strike warfare, amphibious operations, or special operations."[11] This approach, wherein attack operations are considered as part of every mission, dilutes focus on the objective.

Additionally, responsibility for planning and execution is divided among components based on shifting areas of operation (AOs). Doctrine allows AOs to extend beyond the traditional depths of maneuver force operations which enables surface commanders to influence interdiction against forces that will have a near-term impact on operations.[12] Consistent with joint doctrine, targeting of short range ballistic missiles that primarily threaten surface forces should fall under the purview of surface commanders as part of

their counterbattery objective. But changing responsibility based on ground maneuver boundaries for strikes against theater-ranging air threats, which may not be the priority for surface commanders, could expose all forces to increased risk.

Conversely, maintaining command continuity in the counter-TBM fight serves the interests of a theater. JFACCs plan as well as execute theater-wide deep strike operations, to include joint suppression of enemy air defense (JSEAD), air-to-air, surveillance, joint interdiction, and strategic attack. In addition to attack assets, offensive operations against individual mobile missiles such as Scuds may require surveillance and reconnaissance support when organic weapon sensors are not adequate for target discrimination. Until the aircraft and missile threat is defeated, both air-to-air and JSEAD assets must be synchronized not only to support attack missions but also to protect surveillance and reconnaissance assets. Moreover, attack operations will compete with demands by JFCs for interdiction, strategic attack, and other counterair operations. Because of their deep strike and air superiority responsibilities, JFACCs can efficiently integrate attack operations into campaigns for JFCs. By stepping up attacks on the threats that are most difficult to defend against, they can also compliment aircraft and missile defense.

the current JFACC counterair process offers a solid foundation to counter theater missiles

The current JFACC counterair process offers a solid foundation for joint unity of command to counter theater missiles, both offensively and defensively. Centralized planning will occur at the joint air operations center. Liaison personnel integrate component capabilities into the master attack and air defense plan in accord with JFC guidance. Liaison personnel are key to this process since they provide weapons systems expertise for joint planning. They can also articulate the concept of operations as well as the protection priorities of their respective components which allows JFACCs to resolve issues at the lowest level. However, because there is often a shortage of assets, no plan will satisfy everyone, and some issues must be resolved by JFCs. For decentralized execution, component battle management nodes play a critical role, and as these systems become more jointly interoperable overall effectiveness will increase significantly.

This matter can be reduced to either air superiority as one mission with a single commander for theater-wide efforts or to counteraircraft and countermissile operations as separate entities. The former was the approach in Desert Storm and was successful given the constraints of the coalition. The latter reflects the World War II model which led to gross inefficiencies and marginal results. Current and emerging capabilities potentially overlap and there are some voids in offensive as well as defensive operations. To optimize capabilities, a clear command and control process is required for centralized planning and decentralized execution. If air superiority is more difficult to achieve in the future because of threat diversity and WMD, we must maximize our potential by ensuring unity of effort through unity of command. A single commander is at the center of this command process and must be vested with the authority to make decisions and resolve conflicts. To accept anything less threatens the warfighting capabilities of JFCs. JFQ

NOTES

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[7] Ibid., pp. 330–32.

[8] Ibid. Combines charts from pp. 110, 140, and 337.

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[10] Joint Pub 3–52, *Doctrine for Joint Airspace Control in a Combat Zone* (Washington: Government Printing Office, 1995), p. II–6.

[11] Joint Pub 3–01.5, *Doctrine for Joint Theater Missile Defense* (Washington: Government Printing Office, 1994), p. III–12.

[12] Joint Pub 3–0, p. IV–14.